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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/864,070	05/22/2001	Nigel Sammes	2354/114	1011

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EXAMINER

MARTIN, ANGELA J

ART UNIT PAPER NUMBER

1745

DATE MAILED: 06/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 09/864,070	Applicant(s) SAMMES ET AL.	
	Examiner Angela J. Martin	Art Unit 1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2005.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13, 16, 18, 27 and 29-91 is/are pending in the application.
4a) Of the above claim(s) 55-86 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-13, 16, 18, 27, 29-35, 38-43, 48-54 and 87, 91 is/are rejected.
7) ☒ Claim(s) 36, 37, 44-47 and 88-90 is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

[Handwritten signature]

DETAILED ACTION

This Office Action is responsive to the Remarks filed on January 14, 2005.

However, the pending claims are rejected for the following reasons of record.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 32 is rejected under 35 U.S.C. 102(e) as being anticipated by Muthuswamy et al., U.S. Pat. No. 6,060,188.

Rejection of claim 32 drawn to a tubular solid oxide fuel cell.

Muthuswamy et al., teach a tubular solid oxide fuel cell comprising a tubular anode capable of supporting the fuel cell, an electrolyte disposed on a surface of the tubular anode, and a cathode disposed on the electrolyte (col. 2, lines 49-62).

Thus, the claim is anticipated.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 32-35 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muthuswamy et al., U.S. Pat. No. 6,060,188, in view of Kendall, U.S. Pat. No. 5,827,620.

Rejection of claims 32-35 and 54 drawn to a tubular solid oxide fuel cell.

Muthuswamy et al., teach a tubular solid oxide fuel cell as described above.

Kendall teaches a tubular solid oxide fuel cell comprising a tubular anode, an electrolyte disposed on a surface of the tubular anode, and a cathode disposed on the electrolyte (col. 5, lines 21-26). Additionally, it teaches the anode comprises a mixture of stabilized zirconia and nickel oxide (col. 5, lines 21-26); the cathode comprises a strontia-doped lanthanum manganite (col. 5, lines 21-26). It also teaches the tubular anode has a non-circular cross-section (col. 5, lines 59-61).

Thus, it would have been obvious at the time the invention was made to insert the teachings of Kendall into the teachings of Muthuswamy et al., because Muthuswamy et al., teach that the inner electrode can be a cathode or anode. Each of the layers of the tubular fuel cell is capable of supporting each other since the removal of either of the layers would lead to instability.

4. Claims 1-13, 16, 29-31, 87, and 91 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Muthuswamy et al., U.S. Pat. No. 6,060,188, or Kendall, U.S. Pat. No. 5,827,620.

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Rejection of claims 1-13, 16, 29-31, 87 and 91 drawn to a fuel cell.

Muthuswamy et al., teach a fuel cell as described above.

Kendall teaches a fuel cell as described above.

Thus, the claims are anticipated. However, in the alternative, Muthuswamy et al., or Kendall teaches a product that appears to be the same as, or an obvious variant of, the product set forth in a product-by-process claim although produced by a different process. In re Marosi, 710 F. 2d 799, 218 USPQ 289 (Fed. Cir. 1983) and In re Thorpe, 777 F. 2d 695, 277 USPQ 964 (Fed. Cir. 1985).

5. Claims 32, 38, 39, and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muthuswamy et al., U.S. Pat. No. 6,060,188, in view of Ruka et al., U.S. Pat. No. 5,916,700.

Rejection of claims 32, 38, 39, and 54 drawn to a fuel cell.

Muthuswamy et al., teach a fuel cell as described above.

Muthuswamy et al., do not teach a thickness of the anode (supporting electrode) comprises over 50% of a total thickness of the anode, electrolyte and cathode (outer electrode); nor does it teach the anode has a non-circular cross-section.

Ruka et al., teach a thickness of the supporting electrode (col. 3, lines 28-31) comprises over 50% of a total thickness of the supporting electrode, electrolyte (col. 3, lines 38-44) and outer electrode (col. 4, lines 4-10); wherein the thickness of the supporting electrode is 300 μm (col. 3, lines 28-31). Additionally, it teaches the tubular anode has a non-circular cross-section (col. 3, lines 12-15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to insert the teachings of Ruka et al., into the teachings of Muthuswamy et al., because although Ruka teaches a cathode-supported fuel cell and Muthuswamy et al., teach an anode-supported fuel cell, the inner electrode in either case, must be the thicker of the two electrodes in order to provide structural support to the tubular fuel cell.

6. Claims 32, 40-43, 48-52, 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muthuswamy et al., U.S. Pat. No. 6,060,188, in view of Ruka et al., U.S. Pat. No. 5,908,713.

Rejection of claims 32, 40-43, 48-52, 54 drawn to a fuel cell.

Muthuswamy et al., teach a fuel cell as described above.

Muthuswamy et al., do not teach the claim limitations of claims 40-43, 48-52, 54.

Ruka et al., teach a fuel cell wherein the anode comprises a catalyst material of CeO₂ in a proportion of 1.5 to 2 weight percent (col. 5, lines 40-45). It also teaches the anode comprises a volume percentage of nickel of 40 to 50% (col. 7, lines 14-17). Additionally, it teaches the anode comprises more than one anode layer, each layer having a different composition (col. 2, lines 45-65). It teaches the more than one anode layers comprise a thicker support layer and a thinner active layer, the support layer in contact with a fuel gas (col. 7, lines 2-9); wherein the support layer comprises a higher ratio of stabilized zirconia to nickel and wherein the active layer comprises a lower ratio (col. 7, lines 14-17); the support layer comprises about 40 to 50% nickel by volume (col. 7, lines 14-17). It also teaches the active layer comprises an embedded current-

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collecting wire (col. 3, lines 56-59); the support layer comprises aluminum oxide (col. 2, lines 61-65).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to insert the teachings of Ruka et al., into the teachings of Muthuswamy et al., because Ruka et al., teaches the specifics of the anode present in an electrode- supported fuel cell and it also teaches a solid oxide fuel cell "providing the desired combination of conductivity, adherence, electrochemical performance and stability over a long period of time" (Ruka et al., col. 2, lines 32-37).

7. Claims 29, 32, 36-38, 53, 54, 88-90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Muthuswamy et al., U.S. Pat. No. 6,060,188, in view of Stover et al., Electrochem. Society Proceedings.

Muthuswamy et al., teach a tubular solid oxide fuel cell as described above.

Muthuswamy et al., do not teach the cathode comprises at least cobaltate or gadolinium; cathode comprises more than one layer, each layer having a different composition; thickness of the anode; two cathode layers; more than two cathode layers; the composition of the two cathode layers.

Stover et al., teach the cathode comprises at least cobaltate (p. 813, para. 1) or gadolinium (p. 816, para 2); cathode comprises more than one layer, each layer having a different composition (p. 813, Table 1); thickness of the anode (p. 813, Table 1); two cathode layers (p. 813, Table 1); more than two cathode layers (p. 813, Table 1); the composition of the two cathode layers (p. 812, Fig. 1; p. 813, Table 1). It teaches the support layer comprises aluminum oxide (p. 813, para. 1).

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Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to insert the teachings of Stover et al., into the teachings of Muthuswamy et al., because Stover et al., teach a fuel cell having more than one cathode layer, which optimizes the cathode materials and increases the catalytic activity of the cathode (p. 815, last para.). The extruded tube having a non-circular cross-section would be a design choice of the artisan, depending on the shape of the holding device of the tube.

Allowable Subject Matter

8. Claims 36, 37, 44-47, and 88-90 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is a statement of reasons for the indication of allowable subject matter:

The Applicant claims a fuel cell as taught above.

However, the prior art of record does not teach the fuel cell with the limitations of claims 36, 37, 44-47, and 88-90.

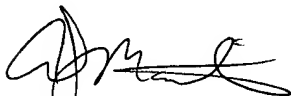
Response to Arguments

10. Applicant's arguments with respect to above claims have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela J. Martin whose telephone number is 571-272-1288. The examiner can normally be reached on Monday-Friday from 9:00 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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